TABLE 4-continued

Component (g)	Separation before crystallization	crystal	filtrate
purity of crystal	—	68%	—
recovery of 2,6-DMN	—	61%	—
yield of 2,6-DMN	—	12.2%	—

"Recovery of 2,6-DMN" means the content of 2,6-DMN in the crystals against the content of 2,6-DMN in the feedstock.

"Yield of 2,6-DMN" means the content of 2,6-DMN in the crystal against the total weight of feedstock.

As shown in Table 4, the yield of 2,6-DMN by crystallization under high pressure is much higher than by cooling crystallization. Further, the 2,6-DMN/total-DMN ratio of the filtrate by crystallization under high pressure is less than 8%. Therefore, the filtrate is more effective as a feedstock for transalkylation and isomerization of 2,6-lean-DMN. Furthermore, when an attempt is made to increase the purity of crystals by cooling crystallization, the yield of 2,6-DMN decreases drastically.

Example 5 Cracking of Distillates from LCO

Example of Cracking

A 50 g amount of MCM-22 is charged into a tubular reactor. The reactor is heated gradually from ambient temperature to 325° C. to dry the catalyst while supplying hydrogen gas. Thereupon LCO distillate (Table 5) is supplied to the reactor at the rate of 50 g/hr and 1.0 hr^{-1} in WHSV, while supplying hydrogen gas at 10 1/hr. The reaction was conducted at 325, 355, 375, and 405° C. The results of cracking are sunmarized in Table 6 below. Initial boiling point data shows that cracking was conducted by contacting LCO feedstock with MCM-22.

Feed stock:

Heart Cut Distillate from Batch Distillation of LCO

Number of Trays=18

Press=20 Torr

Reflux Ratio=10

Initial Boiling Point: 167° C. (by ASTM D-2887)

Components

TABLE 5

	wt. %
Naphthalene	4.02
2-Methylnaphthalene	12.56
1-Methylnaphthalene	6.00
2,6-DMN	0.58
2,7-DMN	0.54
1,3- + 1,7-DMN	0.8
1,6-DMN	0.34
2,3- + 1,4-DMN	0.12
1,5-DMN	0.07
1,2-DMN	0.06
1,8-DMN	0
Others	74.91

Cracking Conditions:

Catalyst: MCM-22(50 gm in Tubular Reactor)

Press.: 15 kg/cm^2

Rate: 50 gm/hr

Hydrogen in Reactor: 10 lit/hr

Temp.: 325° C., 355° C., 275° C., 405° C.

Results:

TABLE 6

Reaction Temp.[° C.]	Initial Boiling Point [° C.] ASTM D-2887
Feed	167
325	129
355	104
375	61
405	29

Obviously, numerous modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claim, the invention may be practiced otherwise than as specifically described herein.

What is claimed as new and is desired to be secured by Letters Patent of the United States is:

1. A process for producing 2,6-dialkylnaphthalene from a feedstock, comprising the following steps:

I. separating said feedstock into a naphthalene, monoalkynaphthalene, dialkylnaphthalene fractions:

II. separating and purifying 2,6-dialkylnaphthalene from said dialkylnaphthlane fraction of step I to produce 2,6-dialkylnaphthalene and a second dialkylnaphthalene fraction;

III. alkylating said monoalkylnaphthalene fraction of step I with an alkylating agent to produce dialkylnaphthalene and recycling the dialkylnaphthalene to step I;

IV. transalkylating said naphthalene fraction of step I and said second dialkylnaphthalene fraction produced in step II, to produce monoalkylnaphthalene, and isomers of dialkylnaphthalene; wherein said monoalkynaphthalene fraction produced in step I is cracked before step III, or in step III, or after step III.

2. The process of claim 1, wherein at least one of said monoalkylnaphthalene, and isomers of dialkylnaphthalene produced in step IV is recycled to step I.

3. The process of claim 2, further comprising cracking of said dialkylnaphthalene fraction and said naphthalene fractions before step IV, or in step IV, or after step IV.

4. The process of claim 1, wherein at least a portion of said naphthalene fraction in step I is fed to step III to be alkylated with said alkylating agent.

5. The process of claim 1, wherein at least step III or step IV is conducted in the presence of a catalyst composition comprising a synthetic zeolite.

6. The process of claim 5, wherein the catalyst having a composition comprising a synthetic zeolite is characterized by an X-ray diffraction pattern including interplanar d-spacing (A)

12.36±0.4

11.03±0.2

8.83±0.14

6.18±0.12

6.00±0.10

4.06±0.07

3.91±0.07

3.42±0.06.

7. The process of claim 1, further comprising (i) separating said dialkylnaphthalene fraction from step I into 2,6-rich-dialkylnaphthalene and 2,6-lean-dialkylnaphthalene fractions, wherein said 2,6-rich-dialkylnaphthalene fraction is utilized in separating and purifying 2,6-dialkylnaphthalene in step II.

8. The process of claim 7, further comprising isomerizing said 2,6-lean-dialkylnaphthalene fraction in the presence of a catalyst, wherein the product in said isomerization is fed to step II and/or step I.

9. The process of claim 8, further comprising cracking of co-boiler of dialkynaphthalene at said 2,6-lean-dialkylnaphthalene stream before isomerization, or with the isomerization, or after isomerization and before step I.

10. The process of claim 8, wherein at least a part of the product in said isomerization is separated into a 2,6-rich-dialkylnaphthalene fraction and other components, and said 2,6-rich-dialkylnaphthalene fraction is fed to step II.

11. The process of claim 8, wherein the isomerization is conducted in the presence of a catalyst composition comprising a synthetic zeolite.

12. The process of claim 8, wherein the catalyst having a composition comprising a synthetic zeolite is characterized by an X-ray diffraction pattern including interplanar d-spacing (A)

12.36±0.4
11.03±0.2
8.83±0.14
6.18±0.12
6.00±0.10
4.06±0.07
3.91±0.07
3.42±0.06.

13. The process of claim 1, wherein at least a part of the feedstock or at least a part of said monoalkylnaphthalene fraction produced in step I is dealkylated, then recycled to step I.

14. The process of claim 7, wherein at least a part of the other components containing alkylnaphthalene having a higher boiling point than naphthalenes in the separation after the isomerization are dealkylated, then recycled to step I.

15. The process of claim 1, wherein a part of said dialkynaphthalene fraction after 2,6-dialkylnaphthalene is separated therefrom in step II are dealkylated, then recycled to step I.

16. The process of claim 1, wherein separation in step I is conducted by distillation, or distillation and extraction.

17. The process of claim 1, wherein 2,6-dialkylnaphthalene is separated by crystallization under high pressure in step II.

18. The process of claim 1, wherein said dialkylnaphthalene is dimethylnaphthalene and said monoalkylnaphthalene is monomethylnaphthalene.

19. The process of claim 1, wherein said alkylating agent is methanol or dimethylether.

20. A process of preparing a polyethylenenaphthalate polymer or polybutylenenaphthalate polymer comprising;

A. oxidizing 2,6-dialkylnaphthalene to form 2,6-naphthalene-dicarboxylic acid; and

B. condensing said 2,6-naphthalene-dicarboxylic acid with a diol selected from the group consisting of ethylene glycol and butanediol to form a polyethylenenaphthalate polymer or polybutyrenenaphthalete polymer

wherein said 2,6-dialkylnaphthalene is produced by a process comprising the following steps:

I. separating a feedstock into a naphthalene, monoalkynaphthalene, dialkylnaphthalene fractions:

II. separating and purifying 2,6-dialkylnaphthalene from said dialkylnaphthlane fraction of step I to produce 2,6-dialkylnaphthalene and a second dialkylnaphthalene fraction;

III. alkylating said monoalkylnaphthalene fraction of step I with an alkylating agent to produce dialkylnaphthalene;

IV. transalkylating said naphthalene fraction of step I and said second dialkylnaphthalene fraction produced in step II, to produce monoalkylnaphthalene, and isomers of dialkylnaphthalene; wherein

said monoalkynaphthalene fraction produced in step I is cracked before step III, or in step III, or after step III.

21. A process for preparing a polyethylene naphthalate polymer or polybutyrenenaphthalate polymer comprising;

A. oxidizing 2,6-dialkylnaphthalene to form 2,6-naphthalene-dicarboxylic acid; and

B. esterifying 2,6-naphthalene-dicarboxylic acid with methanol to form dimethyl-2,6-naphthalene-dicarboxylate; and

C. condensing said dimethyl-2,6-naphthalene-dicarboxylate with diol selected from the group consisting of ethylene glycol and butanediol to form a polyethylenenaphthalate polymer or polybutyrenenaphthalate polymer

wherein said 2,6-dialkylnaphthalene is produced by a process comprising the following steps:

I. separating a feedstock into a naphthalene, monoalkynaphthalene, dialkylnaphthalene fractions:

II. separating and purifying 2,6-dialkylnaphthalene from said dialkylnaphthlane fraction of step I to produce 2,6-dialkylnaphthalene and a second dialkynaphthalene fraction;

III. alkylating said monoalkylnaphthalene fraction of step I with an alkylating agent to produce dialkylnaphthalene;

IV. transalkylating said naphthalene fraction of step I and said second dialkylnaphthalene fraction produced in step II, to produce monoalkylnaphthalene, and isomers of dialkylnaphthalene; wherein

said monoalkynaphthalene fraction produced in step I is cracked before step III, or in step III, or after step III.

22. A process for producing 2,6-dialkylnaphthalene from a feedstock, comprising the following steps:

I. separating said feedstock into a fraction comprising naphthalene and monoalkynaphthalene and a fraction comprising dialkylnaphthalene;

II. separating and purifying 2,6-dialkylnaphthalene from said dialkylnaphthalene fraction of step I to produce 2,6-dialkylnaphthalene and a second dialkynaphthalene fraction;

III. dealkylating said naphthalene and monoalkynaphthalene fraction of step I and said second dialkylnaphthalene fraction produced in step II;

IV. separating a naphthalene and monoalkynaphthalene fraction from said dealkylation product of step III;

V. alkylating said naphthalene and monoalkynaphthalene fraction of step IV; and

VI. recycling a product from step V to step I.

23. A process for producing 2,6-dialkylnaphthalene from a feedstock, comprising the following steps:

I. separating said feedstock into a fraction comprising naphthalene and monoalkynaphthalene, a fraction comprising dialkylnaphthalene and a fraction lean in dialkylnaphthalene;

II. separating and purifying 2,6-dialkylnaphthalene from said dialkylnaphthalene fraction of step I to produce 2,6-dialkylnaphthalene and a second dialkylnaphthalene fraction;

IIa. isomerizing said fraction lean in dialkylnaphthalene;

IIb. separating the isomerization product of step IIa into a fraction comprising dialkylnaphthalene and a fraction lean in dialkylnaphthalene;

IIc. feeding said fraction comprising dialkylnaphthalene of step IIb to step II;

III. dealkylating said naphthalene and monoalkynaphthalene fraction of step I, said second dialkylnaphthalene fraction produced in step II and a fraction lean in dialkylnaphthalene from step IIb;

IV. separating a naphthalene and monoalkynaphthalene fraction from said dealkylation of step III;

V. alkylating said naphthalene and monoalkynaphthalene fraction of step IV; and

VI. recycling a product from step V to step I.

24. A process for producing 2,6-dialkylnaphthalene from a feedstock, comprising the following steps:

I. separating said feedstock into a fraction comprising naphthalene, a fraction comprising monoalkynaphthalene, a fraction comprising dialkylnaphthalene and a fraction comprising remaining products;

II. separating and purifying 2,6-dialkylnaphthalene from said dialkylnaphthalene fraction of step I to produce 2,6-dialkylnaphthalene and a second dialkylnaphthalene fraction;

IIa. dealkylating said second dialkylnaphthalene fraction produced in step II and recycling the product of dealkylation to step I;

III. dealkylating said fraction comprising remaining products of step I and recycling a product of dealkylation to step I;

IV. alkylating said fractions comprising naphthalene and comprising monoalkynaphthalene of step I.

25. A process for producing 2,6-dialkylnaphthalene from a feedstock, comprising the following steps:

I. separating said feedstock into a fraction comprising naphthalene, a fraction comprising monoalkynaphthalene and a fraction comprising dialkylnaphthalene;

II. separating and purifying 2,6-dialkylnaphthalene from said dialkylnaphthalene fraction of step I to produce 2,6-dialkylnaphthalene and a second dialkylnaphthalene fraction;

III. dealkylating said second dialkylnaphthalene fraction produced in step II;

IIIa. recycling the product of step III to step I; and

IV. alkylating said fractions comprising naphthalene and comprising monoalkynaphthalene of step I.

26. A process for producing 2,6-dialkylnaphthalene from a feedstock, comprising the following steps:

I. separating said feedstock into a fraction comprising naphthalene, a fraction comprising monoalkynaphthalene, a fraction comprising dialkylnaphthalene and a fraction lean in dialkylnaphthalene;

II. separating and purifying 2,6-dialkylnaphthalene from said dialkylnaphthalene fraction of step I to produce 2,6-dialkylnaphthalene and a second dialkylnaphthalene fraction;

IIa. isomerizing said fraction lean in dialkylnaphthalene of step I;

IIb. separating the isomerization product of step IIa into a fraction comprising dialkylnaphthalene and a fraction lean in dialkylnaphthalene;

IIc. recycling a dialkylnaphthalene fraction of step IIb to step II;

III. dealkylating said second dialkylnaphthalene fraction produced in step II and a fraction lean in dialkylnaphthalene of step IIb;

IV. alkylating said fractions comprising naphthalene and comprising monoalkylnaphthalene of step I; and

V. recycling a product from step III to step I.

27. A process for producing 2,6-dialkylnaphthalene from a feedstock, comprising the following steps:

I. separating said feedstock, in distillation towers, into a fraction comprising 2,6-dimethylnaphthalene, a fraction comprising 1,6-dimethylnaphthalene and a fraction comprising a remainder;

II. purifying 2,6-dialkylnaphthalene from said 2,6-dimethylnaphthlane fraction of step I to produce 2,6-dialkylnaphthalene and a second dialkylnaphthalene fraction;

IIa. isomerizing said 1,6-dimethylnaphthalene fraction of step I;

IIb. separating the isomerization product of step IIa into a fraction comprising 2,6-dimethylnaphthalene and a fraction comprising a remainder;

IIc. feeding said fraction comprising 2,6-dimethylnaphthalene of step IIb to step II;

III. dealkylating said fraction comprising a remainder of step I, said second dialkylnaphthalene fraction produced in step II, and a fraction comprising a remainder of step IIb;

IV. separating a naphthalene and methylnaphthalene fraction from said dealkylation of step III;

V. alkylating said naphthalene and methylnaphthalene fraction of step IV; and

VI. recycling a product from step V to step I.

* * * * *